United States Department of the Interior

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6763
EA OR125-02-12

Dear Concerned Citizen:

The Coos Bay District of the Bureau of Land Mangement (BLM) has prepared an Environmental Assessment (EA OR125-02-12) analyzing the replacement, removal and modification of stream crossing structures at various locations across the District.

The EA concludes in a Finding of No Significant Impact (FONSI). A copy of the EA and FONSI are attached for your review. Public comments on the appropriateness of the FONSI are being requested until June 25, 2002, at which time the Decision Record will be finalized. Questions should be directed to Dan Van Slyke at (541) 751-4452. Written comments may be sent to BLM at 1300 Airport Lane, North Bend, OR, 97459-2000, Attn: Dan Van Slyke, or e-mailed to us at coos_bay@or.blm.gov attn: Dan Van Slyke.

Comments, including names and street addresses of respondents, will be available for public review at the above address during regular business hours (8:00 a.m. to 4:30 p.m.), Monday through Friday, except holidays, and may be published as part of the EA document or other related documents. Individual respondents may request confidentiality. If you wish to withhold your name or street address from public review or from disclosure under Freedom of Information Act, you must state this prominently at the beginning of your written comment. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in the entirety.

Sincerely,

/s/ Sue Richardson

Sue Richardson
District Manager

Enclosure:
EA and FONSI for EA# OR125 –02-12

Finding of No Significant Impact
Coos Bay District Culvert and Stream Crossing Environmental Assessment
EA# OR125-02-12

I. Introduction

The United States Department of Interior, Bureau of Land Management, Coos Bay District (BLM), has prepared an Environmental Assessment (EA) dated May 28, 2002 that analyzed potential impacts of the replacement, removal and modification of stream crossing structures at various locations across the District.

The purpose of the proposed actions are to restore, enhance, and maintain ecological functions and biological productivity on the Coos Bay District by improving passage of aquatic organisms through stream crossings, and to reduce the potential for sediment delivery to streams from roads, stream diversions, and culvert failures.

The EA evaluates the environmental elements impacted by the stream crossings proposed for replacement, removal, or modification, and the benefits expected to be derived from implementing the proposed actions. The EA also describes the project design features that will be incorporated in order to minimize the potential for adverse environmental harm to occur during and following the construction phase of each project.

II. Background

The Coos Bay District (CBD) of the Bureau of Land Management (BLM) is under the direction of the *Coos Bay District Resource Management Plan* (RMP) and *Environmental Impact Statement* (EIS) and its Record of Decision (ROD)(BLM, 1995). The RMP and its' ROD are in conformance with the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the range of the Northern Spotted Owl* and its ROD (Northwest Forest Plan [NWFP]) (Interagency, 1994). Through these documents, the BLM, in conjunction with other Federal land agencies, is directed to conduct watershed analysis (WA), and to implement restoration projects to aid in the recovery of water quality and aquatic, riparian, and terrestrial habitats.

As stated in the ROD for the NWFP, the Aquatic Conservation Strategy (ACS) was developed to maintain the ecological health of watersheds and aquatic ecosystems on public lands within the range of Pacific Ocean anadromy. The Environmental Consequences section of the EA describes the consistency of the proposed alternative with the ACS.

All Federal agencies are charged with managing programs to enhance the recovery of Federally listed endangered and threatened species and their habitats (Section 7(a)(1) of the Act). Implementing the proposed actions are expected to benefit coho salmon (Threatened), steelhead trout (Candidate) and coastal cutthroat trout (Candidate).

III. Finding of No Significant Impact

A careful review of the EA, which I herein adopt, indicates that there will not be a significant impact on the quality of the human environment from the implementation of any of the Action Alternatives. I agree with this conclusion and determined that an Environmental Impact Statement (EIS) will not be prepared. This determination is based on consideration of the following factors:

1. The proposed activities will occur in localized areas within existing roadways at various locations across the Coos Bay District. The proposed activities are not national or regional in scope.

2. The proposed activities will not significantly affect public health and safety. Best Management Practices incorporating spill kits and containment plans as described in the EA will minimize the risk. In addition, notifications in the event of a release threatening waterways are to be made in accordance with the BLM Coos Bay District Riparian Spill Plan, and Oregon DEQ Administrative Rule (OAR) 340-108, *Oil and Hazardous Materials Spills and Releases.*

3. The proposed activities will not have an impact on unique characteristics of the geographic area such as historical or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecological critical areas. The project areas are located at previously disturbed sites, and the methods utilized for replacement or removal of stream crossings will not permanently affect the physical environment.

4. The effects on the quality of the human environment of the proposed activities are not highly controversial.

5. The possible effects of the proposed activities on the quality of the human environment are not highly uncertain and do not involve unique or unknown risk.

6. The proposed projects do not establish a precedent for actions with future significant effects or represent a decision in principle about a future consideration.

7. There are no significant cumulative effects identified by this assessment. Although the stream crossing projects may result in minor sediment and streambank disturbances in the short-term, the impacts are expected to be low and of short duration.

8. The proposed activities will not affect districts, sites, highways, structures, or objects listed in, or eligible for listing in, the National Register of Historic Places. Nor will they cause a loss or destruction of significant scientific, cultural, or historical resources.

9. The proposed projects will fully comply with the Endangered Species Act of 1973, as amended. While it is recognized that some unavoidable impacts to listed fish species (coho salmon) will likely result from the projects, the impacts are expected to be minor and of short duration. The timing restrictions and design features as described in the EA will be adhered to in

order to minimize adverse effects.

The National Marine Fisheries Service issued a Biological Opinion (BO) dated July 12, 2001, and amended on August 8, 2001, that covers programmatic actions such as culvert replacements and removal. The BO also concludes consultation for Essential Fish Habitat as required by Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-297). It is recognized that projects of this nature will benefit various life stages of coho salmon and other native fish species by improving access and distribution opportunities, and reducing risks to Critical Habitat and Essential Fish Habitat that could occur as the result of a failed culverts.

10. There are no irreversible or irretrievable resource commitments identified by this assessment, except for a minor consumption of fossil fuels for routine operations.

11. The proposed activities will not violate Federal, State, or local laws imposed for the protection of the environment.

/s/ Sue Richardson Date: June 3, 2002

Sue Richardson
District Manager
Coos Bay District
Bureau of Land Management

ENVIRONMENTAL ASSESSMENT

OR125-02-12

Coos Bay District Culvert and Stream Crossing Environmental Assessment

Coos Bay District
Bureau of Land Management

PROPOSED THIS 28th DAY OF MAY, 2002

This Environmental Assessment is tiered to the *Coos Bay District Resource Management Plan* (RMP) and *Environmental Impact Statement* and its Record of Decision (BLM-May, 1995). It is in conformance with the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the range of the Northern Spotted Owl* and its Record of Decision (Northwest Forest Plan - Interagency, 1994).

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Section I - Purpose of & Need for Action

Background

The Coos Bay District (CBD) of the Bureau of Land Management (BLM) is under the direction of the *Coos Bay District Resource Management Plan* (RMP) and *Environmental Impact Statement* (EIS) and its Record of Decision (ROD)(BLM, 1995). The RMP and its ROD are in conformance with the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the range of the Northern Spotted Owl* and its ROD (Northwest Forest Plan [NWFP]) (Interagency, 1994). The above documents are hereby incorporated by reference. Through these documents the BLM, in conjunction with other Federal land agencies, is directed to conduct watershed analysis (WA), and implement restoration projects to aid in the recovery of water quality and aquatic, riparian, and terrestrial habitats.

As stated in the ROD for the NWFP, the Aquatic Conservation Strategy (ACS) was developed to maintain the ecological health of watersheds and aquatic ecosystems on public lands within the range of Pacific Ocean anadromy. The strategy must strive to maintain and restore ecosystem health at the watershed and landscape scales to protect habitat for fish and other riparian-dependant species and resources and restore currently degraded habitat. The Environmental Consequences section of this Environmental Assessment (EA) discusses the consistency of the proposed projects with the ACS.

Projects implemented by the District are not limited to public lands. Section 124 of the Omnibus Consolidated Appropriations Act of 1997, PL 104-208 (the Wyden Amendment), provides the framework by which the BLM may enter into watershed restoration and enhancement agreements. Section 136 of the 1999 Interior Appropriations Act of 1998, PL 105-277 amended the 1997 language to include agreements "with the heads of other Federal Agencies, Tribal, State, and local governments, private and nonprofit entities, and landowners for the protection, restoration, and enhancement of fish and wildlife habitat and other resources on public or private land and the reduction of risk from natural disaster where public safety is threatened."

Projects involving the replacement, removal, modification, or installation of culverts or other stream crossing structures may be developed directly with a willing private land owner/manager, or indirectly through a state, local, or Tribal government or other public entity, educational institution, or private nonprofit organization. Such an agreement may incorporate any instrument including conveyance of an easement, other land use agreement, cooperative agreement, contract, or purchase order used for the purpose of defining mutual responsibilities and any terms and conditions for project installation and maintenance.

Purpose

The purpose of this EA is to: 1) assess any potential environmental impacts that may result if the No Action Alternative or any of the action alternatives are implemented and 2) document the decision-making process involved. This EA uses recommendations from the respective Transportation Management Objectives (TMOs) and Watershed Analyses in regards to roads, water quality, and aquatic organism passage barriers for projects on lands managed by BLM.

The primary goals are to restore, enhance, and maintain ecological functions and biological productivity on the Coos Bay District by improving passage of aquatic organisms through stream crossings and removing culverts on roads not presently needed for the transportation system. The projects implemented will also benefit hydrologic functions, thereby reducing the potential for sediment delivery to streams from roads, stream diversions, and culvert failures.

Need

The WA process utilizes the *Western Oregon Transportation Management Plan* (BLM, June 1996) and Coos Bay TMOs, hereby incorporated by reference, to recommend appropriate road management for multiple resource objectives. Through the WA and TMO processes, interdisciplinary teams identify roads needed for permanent road systems, and levels of closure for roads not needed. Culverts proposed for replacement or improvement are on roads that have been identified as components of the permanent transportation system with reciprocal rights-of-way, and are to be maintained for forest operations and public access; closure is not an option at this time. Culvert removal projects are on roads not needed for transportation at this time or the immediate future.

Due to the extensive road network present on public and private lands across much of the Coos Bay District, many perennial streams are crossed multiple times by roads, sometimes substantially affecting the continuity of aquatic ecosystems. Road and stream crossing structures have been shown to function as barriers to the movement and dispersal of many fish and aquatic-dependant wildlife species. The most common problems with culverts are typically associated with excessive water velocities or vertical barriers to fish passage (Baker and Votapka, 1990). Culvert outlets not in contact with stream bottoms can restrict or preclude passage. Undersized culverts can constrict flows, creating high velocity barriers and increased bank erosion and channel degradation downstream. Many culverts that are passable for adult salmon present barriers to small salmonids and fish species with lesser swimming abilities. In some cases, shallow water in a culvert can allow passage of small fish, but restrict the movement of large fish during some flow stages. Culverts with deteriorating bottoms can kill or injure fish.

Culverts can also act as complete or partial barriers to amphibians and other aquatic-dependant species for the same reasons they constitute barriers to fish (i.e. excessive velocities or vertical barriers). Even in culverts that function well for fish passage, it is possible that passage for other organisms is restricted or precluded when stream substrate is not present within the culvert. For this reason, culvert designs should provide for the retention of substrate when practicable[1].

[1] Substrate retention throughout the course of culverts is difficult to achieve in cases where culverts are placed at slopes exceeding approximately 5%.

Decision(s) To Be Made

1. Not to implement the proposed projects (i.e. No Action), or

2. Implement the proposed projects as described in this EA (i.e. any combination of the Action Alternatives), or

3. Implement the proposed projects with specific additional management constraints/mitigation measures.

Scoping

The primary purpose of scoping is to identify agency and public concerns relating to a proposed project and helps define the issues and alternatives that are examined in detail in this EA. The initial scoping process consisted of an ID Team that identified potential issues in the development of alternatives to the proposal. Scoping information and specialist input can be found in the Analysis File for this EA, hereby incorporated by reference.

Issues, Concerns, and Opportunities

Aquatic species movement and dispersal: Many existing culverts allow only adult salmonid passage, while others do not allow for passage for fish of any size. In some instances, culverts are barriers to fish of any size during low flow periods. Many culverts likely function as barriers to juvenile or non-salmonid fish species such as sculpin or dace, as well as other aquatic species including crayfish and aquatic invertebrates. These species may be incapable or unlikely to enter a culvert which is not in direct contact with the stream bottom, or they may be incapable of moving through a structure which does not provide a natural surface stream bottom.

Amphibian movement and dispersal: Although no known research on amphibian passage through culverts has been conducted on species endemic to Southwest Oregon, it's likely that some culverts, even those that allow juvenile salmonid passage, can present partial or complete barriers to upstream movement and dispersal of aquatic-dependant amphibians. Because these organisms are highly-dependant upon gravel and larger substrate for concealment and protection from stream velocities, it can be assumed that the substrate is important to their movement through stream crossing structures.

Water Quality: Undersized, crushed or restricted inlets, rusted and leaking-through road fills, and/or poorly maintained culverts and surrounding fills have a potential for failure during high flow events. Due to budget constraints, a significant portion of the road network is not maintained to design standards. Additionally, these failing culverts are only replaced on an emergency basis after the road has failed. These situations typically lead to sudden and excessive sediment delivery to the aquatic system resulting in impacts to macro-invertebrate, amphibian, and fish populations. Laboratory studies have demonstrated potential negative effects of fine sediment on macroinvertebrates, on survival and emergence of salmonid embryos and alevins, and on growth of salmonid fry. (Everest et al. 1987)

Traffic Interruptions: Most replacements of culverts will interrupt vehicle travel or temporarily impede access because of the nature of the work necessary to accomplish the work. The majority of the culverts listed in Table 1 below are on BLM managed roads, and it's expected that the affected roads will be closed at the project sites for approximately 2 to 3 days. There's a potential for a given road to be closed for up to two weeks or longer if unforeseen problems are encountered, or a considerable amount of fill material and concrete structures is need, but most will take only a few days to complete. A project site with an expected time delay and a high traffic volume may require a temporary bypass to be constructed. The projects involving only culvert modifications will cause minor delays, if any. All culvert work is expected to occur between July 1 and September 15 of the year they are implemented.

Issues Identified

Economics

Open-bottom stream crossing structures such as bottomless culverts, arched concrete culverts, or bridges, are typically preferred because they provide a near-natural stream bottom. However, installation of these structures can be considerably more costly. For example, as portrayed in the cost estimates for the various alternatives in Table 2 below, the costs for installing a bridge or other full-spanning concrete structure over a moderate-sized stream can exceed $100,000, while a corrugated metal culvert incorporating baffles or weirs to improve passage at the same location can cost half as much. Therefore, economics is a key consideration in selecting the specific type of structure to be installed at any given location. In general, culverts are utilized on small streams, and open-bottom concrete structures are used on larger streams; especially on paved roads serving as primary transportation routes. The final determination is made on a case-by-case basis by BLM managers, and sometimes with input from outside groups or agencies.

The expected longevity of stream crossing structures is also an important consideration in selecting the type of structure to be utilized. Based on the evaluation of culverts on District that have been replaced in the past, round, metal culverts of the size that are proposed for replacement remained structurally sound for approximately 30 to 40 years. Therefore, it's expected that replacements with metal culverts without open bottoms would remain functional for at least that period of time. However, new culvert materials with heavier gauge and aluminized metal that are currently being used could be expected to remain functional for longer periods of time. And because replacements are typically increased in size significantly, and have wide, flat bottoms, the opportunity exists to repair the bottoms of the culverts with concrete or other materials and increase their functional time span considerably.

Bottomless arched culverts are expected to remain structurally sound for a period of 40 to 50 years because they lack metal bottoms that are subject to wear, rust or corrosion. However, the metal on the lower sides of the culvert are subject to wear during high flows, but to a lesser degree than a culvert with a metal bottom. Bottomless pre-formed concrete structures and bridges can be expected to remain structurally sound for a period of 80-120 years, and repair, rather than replacement, may be an option if structural problems occur.

The estimates of the expected longevity of the different types of stream crossing structures are only approximations based on the evaluation of similar structures in the region. However, the potential

exists for a landslide, flood, or other natural event to occur at any of the project sites that could damage or destroy the stream crossing, regardless of the design. It's reasonable to assume that a blocked culvert could result in greater damage to a road than would occur with a concrete structure, but the extent of damage can be highly variable dependant upon the amount of material, road surface type, amount of road fill, and the slope of the road in proximity to the stream crossing.

It could be assumed that the cost of the No Action alternative is zero. In actuality, the cost of not improving a stream crossing could result in an increase in maintenance costs due to undersized and/or poorly designed drainage structures. If they're not replaced or removed, there may be additional clean-up costs and impacts to aquatic species through degradation of the environment associated with road fill/culvert failures. Road fill failures could result in large pulses of sediment release to downstream reaches, impairing water quality and possibly injury or mortality of aquatic and riparian species in the vicinity of the projects. Depending on the time of year and the project location, there could also be significant detrimental impacts to spawning fish or their habitat that could persist for years. The decision on whether to go forward with the proposed action will take into consideration potential impacts of the No Action alternative.

Objectives

1. Maintain, protect, or improve the existing infrastructure of the transportation system as recommended through the WSA and TMO interdisciplinary team processes.

2. Reduce barriers to movement and dispersal of aquatic-dependant organisms.

3. Reduce the risk of culvert failure and input of large quantities of fine sediments from the road fill to aquatic resources.

4. Aid in the recovery of special status fish species by increasing their range and improving access to historical habitats.

5. Design stream crossings to withstand a theoretical 100-year flood event at a minimum.

Geographical Area

Proposed project sites are located at various locations throughout the Coos Bay District as listed in Table 1 below.

Permits, Licenses, and Entitlements

All permits, licenses, and entitlements necessary to implement the proposed projects will be obtained by the responsible parties.

Section II - Description of Alternatives including the Proposed Action

No Action - Alternative No. 1

Under the No Action alternative, no stream crossing restoration projects would be carried out. However, emergency culvert repairs and replacement would continue as necessary. The expected outcomes of the No Action Alternative are summarized in Section IV - Environmental Consequences.

Action Alternatives No. 2, 3, 4 and 5

This action could consist of a single action alternative described below, or any combination of action alternatives. The selection would be based on project design criteria, site-specific conditions such as stream size and channel slope, road type and use, projected life span of the structure, and cost. Alternatives 2 through 5 consist of various options for culvert projects as follows:

- Alternative 2 includes projects that do not involve culvert replacement, such as modifications to improve passage through existing culverts that are structurally sound, at a considerably lower cost than replacement, and the removal of culverts on roads that are not needed for the transportation system at present or the foreseeable future. As such, no additional alternatives are proposed for the removal projects other than the No Action Alternative.

- Alternative 3 would replace existing culverts with metal culverts countersunk into the substrate and/or incorporating baffles to create a flat bottom and aid in the retention of stream substrate to simulate a natural stream bottom.

- Alternative 4 is for open-bottom metal arch culverts seated on concrete footings. This type of structure simulates a natural stream bottom, and larger substrate is typically placed within the course of the crossing to aid in the retention of gravel and finer substrate.

- Alternative 5 consists of culvert replacements with concrete, pre-formed open bottom structures or bridge intended to simulate a natural stream bottom. Pre-formed arched culverts are not currently available in sizes under 12 feet in width, and in some cases, aren't appropriate for small streams. Like other open bottom structures, larger substrate is placed within the structure to encourage retention of smaller substrate.

The cost estimates given for the various replacement alternatives listed in Table 2 are based on similar projects implemented in the past, as well as site-specific conditions. However, actual costs will not be known until designs are finalized and contracts are awarded, and could vary considerably from the estimates. Cost variations are primarily due to stream size, road surface type (gravel or paved), the amount of fill over the existing structure, and/or the distance to source materials or waste areas.

The physical removal or replacement of stream crossings occurs in a similar manner, regardless of the structure utilized. Wether a culvert or bottomless structure is installed, similar equipment and methods are used to accomplish the work as described under Project Design Features below. The

primary differences are the amount of time required to accomplish the work, which is highly dependant upon the amount of fill to be removed and replaced, the type of road surface involved, and any concrete work associated with placing a bottomless structure. Although cranes are usually necessary for placing large structures, and excavators or other smaller equipment can be used to replace small ones, the actual equipment used is at the contractors discretion.

All projects involving culvert replacements described below are expected to retain substrate within the structures, with the exception of Alternative 2 for the culvert modification on John's Creek mainstem. This culvert does not presently retain substrate throughout the bottom, and the modifications would maintain this condition, while improving passage for fish (steelhead trout and resident cutthroat trout). If passage for amphibians and other less-mobile aquatic life is dependant upon substrate throughout the length of the culvert, the existing condition for passage for these organisms would be maintained if the alternative to modify the outlet is selected.

Table 1: Project Names, Legal Locations, and Watershed Locations

Site Name	Legal Location (Township, Range, Section)	Tributary To
John's Creek Mainstem	29-11-07	Lower North Fork Coquille River
John's Creek Tributary	29-11-07	Lower North Fork Coquille River
Upper Moon Creek #1	26-11-25	North Fork Coquille River
Upper Moon Creek #2	26-11-25	North Fork Coquille River
Steele Creek Box Culvert on Coos County Road (Wyden Project)	27-12-26	North Fork Coquille River
North Fork ElkCreek	28-11-26	East Fork Coquille River

Table 2. Site Name, Location, and Structure Design Alternatives and Estimated Costs					
Project Name	**Reason for Replacement, Modification, or Removal**	**Alternative #2 & Estimated Cost Range** **No Replacement: Existing Culvert Modified or Removed Permanently**	**Alternative #3 & Estimated Cost Range** **Replace Culvert with an Arched Culvert with Baffles/Weirs**	**Alternative #4 & Estimated Cost Range** **Replace Culvert with Wide Arch Culvert on Concrete Footings**	**Alternative #5 & Estimated Cost Range** **Replace Culvert with Open-bottom Pre-formed Concrete Arch or Full Spanning Bridge**
John's Creek Mainstem	Culvert is structurally sound, however, the perched outlet restricts passage for small fish and other aquatic organisms.	Existing culvert will remain, baffles will installed, and a structure will be constructed at the outlet to improve passage. ~ $5 - $10 k	$60 - $80 k	$100 - $120 k	$120 - $150 k
John's Creek Tributary	Culvert is perched and rusting in the bottom. Barrier to small fish and other aquatic organisms.	Modification or removal not appropriate because road is needed, and the culvert is not structurally sound.	$30 - $40 k	$60 - $100 k	$100 - $120 k
Upper Moon Creek #1	Crossing has already failed. Road fill and failed culvert needs to be removed to prevent additional sediment delivery.	The road this crossing is on is not needed, and replacement is not necessary. Slopes will be contoured and re-vegetated to minimize erosion.	Not Applicable	Not Applicable	Not Applicable
Upper Moon Creek #2	Crossing has partially failed and needs to be removed to prevent future large-scale failure.	The road this crossing is on is not needed, and no replacement is being proposed. Slopes will be contoured and re-vegetated to minimize erosion.	Not Applicable	Not Applicable	Not Applicable

Table 2. Site Name, Location, and Structure Design Alternatives and Estimated Costs					
Project Name	**Reason for Replacement, Modification, or Removal**	**Alternative #2 & Estimated Cost Range** **No Replacement: Existing Culvert Modified or Removed Permanently**	**Alternative #3 & Estimated Cost Range** **Replace Culvert with an Arched Culvert with Baffles/Weirs**	**Alternative #4 & Estimated Cost Range** **Replace Culvert with Wide Arch Culvert on Concrete Footings**	**Alternative #5 & Estimated Cost Range** **Replace Culvert with Open-bottom Pre-formed Concrete Arch or Full Spanning Bridge**
Steele Creek Box Culvert on Coos County Road (Wyden Project)	Fish passage limited due to elevation of box culvert bottom. Top of culvert has structural problems (sagging and concrete is cracked).	Located on Coos County road; modification or removal not appropriate.	Not Applicable	Not Applicable	This stream crossing is on a County highway, and the replacement is being designed by Coos County.
North Fork Elk Creek	Bottom of culvert has completely rusted out and the road fill is actively failing. High risk of collapse and future large-scale failure on a main-line road and known fish spawing and rearing habitat.	Modification or removal not appropriate because road is needed, and the culvert is not structurally sound.	$100 - $120 k	$140- $160 k	$180 - $210 k

Design Objectives for Culvert Replacement Projects Common to all Action Alternatives

1. Size culverts or open-bottom stream crossings approximately as wide as the active stream channel in order to maintain the natural stream-bed width, and normal stream hydraulics.

2. As a general rule, stream culverts should not be installed at gradients exceeding approximately 5% because powerful stream energies can damage the structure or require special hydraulic modification to allow fish passage. If a steep culvert is planned, design engineering must show that the culvert can pass flow without damage and meet fisheries passage concerns at a high level of probability. In these situations, logs, weirs, or other structures could be installed to increase water depth, provide resting areas, or retain substrate. In some cases, individual or a series of weirs would be located downstream to backwater the culvert.

3. Where feasible, install all culverts so the outlet is in direct contact with, or counter-sunk below the natural stream bottom in order to provide access for lamprey, amphibians, invertebrates, and other less mobile aquatic organisms to the degree practicable.

4. To provide low velocity or protected areas within the culvert, incorporate baffles, boulders, or other structures. These controls act as seeding structure to facilitate deposition and retention of natural substrates (gravel and cobble) throughout the stream crossings. Retaining stream substrate within culverts placed at slopes exceeding approximately 5% is not feasible in many cases. In these situations, weirs should be designed to create a series of resting pools throughout the culvert to provide fish passage.

5. In situations where culverts would be installed at grades greater than or similar to the existing culvert, or when retro-fitting culverts to improve passage, installation of individual or a series of logs, weirs, or other structures should be used to increase water depth, provide resting areas, and/or retain substrate.

6. Where practicable, maintain the water depth at stream crossings sufficient to pass the largest fish likely to be actively migrating during any given season. Generally, the minimum water depth should be approximately 12 inches during the return season for adult salmon and steelhead trout; typically November through April. The minimum water depth is important because partially submerged fish cannot swim or breathe efficiently, and if water depth is too shallow, fish can be injured by scraping themselves on the bottom of the culvert (Robison et al. 1999).

7. Remove stream crossing culverts with a high likelihood of failure on roads identified through the TMO or Watershed Analysis procedures not currently needed for transportation. Stabilize the crossing site to prevent large-scale sediment delivery to aquatic resources by shaping the channel banks back to match the up and downstream configurations, generally a ratio of 1.5:1, but on higher order streams it may be 2:1 for flood plain connectivity. The channel bed may need to be protected from an upstream running head-cut by one or a series of steps that will not erode, and provide transition between the upstream and downstream stream gradient.

Project Design Features

Equipment used to remove and replace culverts will typically consist of an excavator or backhoe for removing and replacing the fill over the stream crossings. Dump trucks are typically utilized to transport fill materials to and from project sites and waste areas when appropriate. Cement trucks are used to pour concrete footings for bottomless culverts. A crane is normally used for placing pre-formed concrete structures. On gravel roads, a front-end loader, grader or dozer is used to spread the rock. On paved roads, an asphalt spreader is used for resurfacing. A roller is used for compaction on both rock-surface and paved roads. A hydro-mulcher/seeder is utilized to stabilize bare soil areas when work is completed. Pumps are often used to temporarily bypass stream flow from the work area during construction activities. The exact equipment used to accomplish the work is typically at the contractor's discretion.

The following list describes the design features that would be implemented for the proposed projects:

1. During construction, techniques designed to minimize sediment delivery and turbidity (such as stream diversions using pumps or gravity flows and sediment control ponds) shall be used. Silt dams and filters (such as straw bales) shall be used to filter sediment from the water downstream of the project site. Appropriate controls shall be in place before instream work is started.

2. The Contractor/Operator is required to submit evidence of a Spill Prevention and Containment Plan consistent with Oregon Department of Environmental Quality and Forest Practices Act, Oregon Department of Fish and Wildlife (ODFW), and BLM guidelines for in/near stream operations. In addition, a spill containment kit shall be present on site during equipment operations.

3. The Oregon Department of Environmental Quality (DEQ) turbidity stand must be followed, which necessitates the incorporation of selected BMP's before the project begins to limit turbidity, and monitoring at two hour intervals for compliance.

4. Instream work shall occur during instream work periods designated by the ODFW. The instream work period is typically during the dry season between July 1 and September 15. Extensions of normal work periods must be obtained from ODFW prior to the end of the normal work season.

5. If significant headward channel degradation is expected to occur due to changes in culvert grade or alignment, a series of step down pools will be established that are passable to upstream fish migration to the extent practicable.

6. Removed fill material from road beds, culvert inlets and from channel bank shaping shall be placed at stable locations as per District waste management policy developed for engineering and road maintenance projects. In addition, the waste areas and the route between the site and the waste area shall be cleared of all Port Orford Cedar as per District policy.

7. All fill materials shall be compacted in lifts to obtain at least an 85% maximum density to ensure soil strength is maintained over culverts.

8. Preacher and Blachly soils are classified as "poor" in consideration of road building, due to poor strength. Unless approved by engineering specialists, these soils shall not be used in road fill for the proposed culvert projects. Additional soil property information, including AASHTO classifications, can be found in the Coos County Soil Survey.

9. Upon completion of construction activities, all exposed soils and waste areas shall be stabilized with a mixture of weed-free straw mulch and seed. Mulch shall cover the ground until it is no longer visible, or at an application rate of at least 2500 pounds. per acre. The District native grass mix seed shall be used, if available. If not, the standard District mix of annual and perennial ryes shall be used. Sites with considerable fill or bare slopes will use biodegradable mats to stabilize soils. When practicable, use existing established vegetation from the vicinity of the project site to re-vegetate/stabilize the slopes .

10. To mitigate the introduction or spread of noxious weeds, or the Port-Orford-Cedar root disease Phytophthora lateralis, vehicles and equipment will be washed prior to entering BLM lands and are required to stay within road rights-of-way.

11. Noxious weed plants, on project sites, will be treated prior to any project activities. Treatment area (manual, mechanical, or chemical) will be large enough to limit contact with weeds/seeds. Where possible, existing native vegetation will be retained to provide shade, and existing seed beds and soil disturbance shall be minimized.

12. Stream crossing contracts shall include standard stipulations for cultural resources, hazardous materials, and special status species.

13. For culverts with Port Orford Cedar (POC) at the project site as identified below under Section III, Affected Environment, the following design features should mitigate any effects on maintaining POC as a species and reducing the spread of Phytophthora lateralis root rot (PL). Road-side sanitation at the projects sites, waste disposal sites, and haul roads to disposal sites shall be treated as follows:

    - All green POC and Pacific Yew, if found within 25 feet up slope from the road edge (if cut slopes are greater than 5' in height remove POC only between the road edge and the top of the cut slope) and 30 feet slope distance downhill from the shoulder of the road of designated waste disposal haul roads, waste disposal sites, and culvert replacement locations on BLM administered lands, will be pulled or cut below the lowest live limb.

    - At culvert replacement location sites: cut all POC within 50 feet of each site of the road edge in the project work area. Most observed POC seedling/sapling mortality occurs within 20 feet of roads, except at stream crossings where the mortality extends further downslope. POC seedlings are more prevalent on disturbed cut slopes and fill slopes.

    - POC trees greater than 8" in diameter will be cut and/or removed 50' downhill and 25' uphill from road shoulders, ditches, and around waste disposal sites on BLM administered lands. This is recommended to help reduce the seed source of POC along the roadsides.

Approval to haul excavated waste on these roads will not occur before sanitation of POC occurs.

- Clean vehicles and equipment prior to move-in on BLM lands to prevent the spread of PL.

Alternatives Considered but Not Analyzed

Due to the conditions specific to each stream crossing, the presence of listed fish, watershed restoration recommendations, and legal requirements, there's little opportunity for reasonable additional alternatives to be considered beyond those listed in Table 1 for structure design alternatives. Roads managed by BLM considered in this EA for culvert repair or modification have been identified as components of the permanent transportation system, through the Watershed Analysis and TMO process, and are to be maintained for forest operations and safe public access. Projects involving only culvert and fill removal are on roads not needed for transportation at this time or the foreseeable future. Closure of other roads is not a viable alternative at this time.

Section III - Affected Environment

The Affected Environment section describes the environmental components that could be affected by the projects if the Proposed Actions are implemented. This section does not address environmental effects or consequences, but rather serves as the baseline for the comparisons in Section IV - Environmental Consequences.

Wildlife - Including Threatened or Endangered (T&E) Species

Many of the wildlife species native to western Oregon are closely associated with aquatic and riparian habitats. Some species such as songbirds and bats are very mobile, and can easily travel between disjunct patches of habitat. The location and design of stream crossings do not directly affect their ability to utilize the available habitat. Other species, most notably amphibians and aquatic invertebrates, have very limited movement and dispersal capabilities, and may be affected by the design of stream road crossings.

Amphibians are important components of many ecosystems, occupying key trophic positions in the food webs of aquatic systems (Blaustein et al 1995). Adults can be top predators, while the larvae and juveniles are often a major prey source for many species of wildlife (Blaustein et al 1995). Amphibians are the most abundant vertebrate group in many forested ecosystems, and the Pacific Coast harbors a particularly high number of endemic species (deMaynadier and Hunter 1995). Ten species of amphibians are associated with stream habitats in the region as depicted in Table 3.

Table 3. Amphibian species potentially occurring near the proposed project sites. Special Status Species List - January 2000 (BLM I.B. OR-2000-092)

Common Name	Scientific Name	Special Management Status
Pacific Giant Salamander	*Dicamptodon tenebrosus*	None
Southern Torrent Salamander	*Rhyacotriton variegatus*	Bureau Tracking State Sensitive Vulnerable
Northwestern Salamander	*Ambystoma gracile*	None
Dunn's Salamander	*Plethodon dunni*	None
Rough-skinned Newt	*Taricha granulosa*	None
Pacific Tree Frog	*Hyla regilla*	None
Tailed Frog	*Ascaphus truei*	Bureau Tracking State Sensitive Vulnerable
Red-legged Frog	*Rana aurora*	Bureau Tracking State Sensitive Undetermined

Table 3. Amphibian species potentially occurring near the proposed project sites. Special Status Species List - January 2000 (BLM I.B. OR-2000-092)		
Common Name	**Scientific Name**	**Special Management Status**
Yellow-legged Frog	*Rana boylii*	Bureau Tracking State Sensitive Vulnerable
Western Toad	*Bufo boreas*	Bureau Tracking State Sensitive Vulnerable

In addition to vertebrates, there are a variety of crustaceans, freshwater mollusks and aquatic insects which inhabit these stream systems; most of which have limited capabilities for upstream movement and dispersal. These invertebrates constitute a major portion of the biomass produced in aquatic systems, and play key roles in the aquatic ecosystem; processing the nutrients stored in vegetation and litter entering the stream, and providing major prey sources for a wide variety of aquatic and terrestrial wildlife species (Christensen 1996).

Reviews for Threatened and Endangered wildlife species for each project site are documented in the Analysis File for this EA. Reviews were conducted for known northern spotted owl, marbled murrelet, bald eagle, golden eagle, peregrine falcon, and osprey nest sites within the vicinity of each project site. All sites are within 35 miles (Zone 1) of the coast for determining marbled murrelet restrictions. However, based on the reviews and surveys, no non-discretionary Project Design Criteria (PDC's) as appropriate mitigation measures are needed to be implemented in accordance with Appendix A of the Biological Opinion from the US Fish & Wildlife Service (#1-7-98-F-079) for projects of moderate duration with low-to-moderate noise levels where no blasting is required, because of the respective locations of each project. However, should blasting be required at any project site, a wildlife biologist shall be notified to determine the applicable PDC's. No seasonal and/or daily timing restrictions will apply to the projects.

Aquatic Habitat/Fisheries, Including T & E Species

Fish Species

The following lists the fish species that occur in the subwatersheds in which the proposed projects are located. Other than the salmonids listed, the occurrence of the non-salmonid fish species in relation to the proposed projects reaches has not been documented by BLM staff:

Salmonids	Other Fish Species
• chinook salmon	• threespine stickleback
• coho salmon	• speckled dace
• chum salmon	• largescale sucker
• steelhead trout	• Pacific lamprey[2]
• resident and sea-run cutthroat trout	• western brook lamprey
	• prickly sculpin
	• reticulate sculpin

The waterfall that is approximately 1/3 mile downstream of the two culverts proposed for replacement on John's Creek is believed to be a barrier to all salmonids except for steelhead trout, and even their passage is likely limited to large rain events. Resident cutthroat trout are the only other salmonids that has been observed upstream or downstream of the culverts above the waterfall, but it's likely that Pacific lamprey also migrate above the falls.

The proposed culvert removal projects in the Moon Creek subwatershed are not located within fish-bearing stream reaches. Both are located from approximately 1/4 to 1/3 mile upstream of the known upper range of coho salmon, steelhead trout, and resident cutthroat trout.

Other than chum salmon, all of the salmonid species listed above are known to occur in Steele Creek and North Fork Elk Creek in the vicinity of the proposed culvert projects.

T & E Species

The proposed projects are located in the Oregon Coast (OC) Evolutionarily Significant Unit (ESU), which extends south of the Columbia River and north of Cape Blanco. The following summarizes the Endangered Species Act status of salmonids within the ESU:

- OC coho salmon were listed as "threatened" on August 10, 1998, and Critical Habitat was designated February 16, 2000.

- Steelhead trout were listed as a Candidate species on March 19, 1998. Critical habitat is not designated for candidate species.

- On April 5, 1999 the Oregon Coast coastal cutthroat trout ESU was designated as a "candidate" for listing due to concerns over specific risk factors. This species is under the jurisdiction of the U.S. Fish and Wildlife Service.

If OC Coho or any other fish species are listed at the time of implementation of the proposed actions, they will be referred for informal and formal consultation, where appropriate, to the U.S. National Marine Fisheries Service (NMFS) to seek concurrence with recommended determinations in

[2] Pacific lamprey are listed in Oregon as Proposed Sensitive (statewide).

accordance with Section 7(a) of the Endangered Species Act (ESA) of 1973 as amended. At present, the Coos Bay District is covered by a programmatic Biological Opinion (BO) from NMFS that covers fish passage improvements, and the projects proposed in this EA will be implemented in accordance with the Project Design Criteria (PDC) as described in the BO.

Essential Fish Habitat

Regardless of the listing status of fish under the Endangered Species Act, under section 305 of the Magnuson-Stevens Act, Federal agencies which authorize, fund, or undertake any action which may adversely affect Essential Fish Habitat[3] (EFH) are required to consult with NMFS in order to receive recommendations on measures necessary to conserve and enhance EFH where applicable. However, the BO from NMFS as described above covers EFH, and consultation is not necessary as long as the projects are implemented in a manner consistent with the Project Design Criteria outlined in the BO.

Water Quality, Wetlands, and Riparian Habitats

The stream channels and floodplains within the project areas have been affected by existing roads and crossing structures. Culverts have constricted stream channels causing substrate deposition above culverts, increasing water velocities within the structure, and resulting in downstream bank erosion and channel degradation. Sedimentation has not been a problem at all of the site project sites, but undersized, rusted, and/or minimally maintained culverts increase the risk for failure of these structures and surrounding fills. Roads constructed in floodplains have constrained the channels and have isolated portions of the floodplain from interaction with the stream.

North Fork Elk Creek, tributary to Elk Creek and the East Fork Coquille River, is a moderately steep (4%), vertically contained stream without a floodplain. The active channel width is about 16 feet, and the substrate is mostly bedrock in the vicinity of the crossing. The drainage area is 2.7 mi^2. The watershed is essentially outside of the intermittent snow accumulation zone. Water is currently flowing under the paved Elk Creek Road (28-11-29) below a nonfunctional 72" culvert, due to the rusted out and failed condition. The fill subgrade has slumped about 2 feet on the inlet side, but water is still passing under the road. The culvert passed the 1964 flood event, but the channel was scoured by about 4 feet below the culvert outlet. Fill height to the road is in excess of 20 feet. Expected flows at a therotical100 year flood event are approximately 600 cfs. Bankfull flow is approximately 200 cfs and normal winter flow is in the range of 75-150 cfs.

The culverts proposed for removal in the upper Moon Creek watershed are on an abandoned road that has not been accessible for routine maintenance for over a decade. Much of the road fill over Upper Moon Creek #1, located on a small 2nd order non-fishbearing perennial stream, failed at some time in the past, and approximately half of the original fill remains. At present the channel is flowing through the deeply-incised fill that remains, delivering sediment to downstream reaches during high flows.

[3] Essential Fish Habitat (EFH) is defined to include those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity. Analysis and discussion in this EA concerning fish habitat and water quality pertain to EFH.

Upper Moon Creek #2 is on a non-fishbearing 3rd order stream channel, within approximately 1/3 mile of the fish-bearing portion of Moon Creek downstream. The inlet of the culvert has been compressed by woody debris, causing the stream to rise and erode the road fill during rain events. If the restricted inlet is further blocked by debris, most of the remaining fill is likely to be deposited in the stream channel and floodplain downstream of the crossing.

The remaining proposed projects are located directly on fish-bearing stream reaches, and present partial barriers to fish passage because the outlets are elevated above the stream level immediately downstream. At present, the integrity of the road fill appears to be good at this time with minimal erosion occurring at any of the sites. However, although the bottom of the John's Creek tributary culvert is rusted, and the ceiling of the Steele Creek box culvert has several cracks and is sagging in some locations, it's not possible to predict when they may collapse or fail due to structural failure.

Cultural Resources

Examination of office records did not indicate that cultural resources were recorded in the vicinity of the proposed culvert replacement localities. Initial culvert placement/construction did not reveal the presence of cultural deposits and this culvert replacement projects will not disturb ground outside of the original disturbance area. Therefore, a field review was not undertaken. Since these locations were disturbed during the initial culvert placement, any additional disturbance during culvert replacement activities will not be likely to affect cultural resources. Should cultural resources be discovered during project work, standard contract language requires cession of work and notification of the District Archeologist.

Hazardous Materials

A level-one field review by project development personnel has been done and submitted to the Hazardous Materials Specialist. No Hazardous Materials were identified on site and no field review is planned by the specialist.

Special Status, Survey & Manage, and T&E Botanical Species

No documented special status plants or Survey and Manage Strategy 1&2 species occur within or adjacent to the proposed project sites. All sites are within existing road prisms, therefore, it is unlikely that any habitat exists for these plants within the proposed project sites.

Noxious Weeds

The noxious weeds of most concern which can be found in the District are: Gorse, Himalaya blackberry, Japanese knot weed, bull or Canadian thistles, Purple loosestrife, and brooms (Scotch, French, Spanish, and Portugese). A complete list of the noxious weeds of concern can be found in the analysis file.

Port Orford Cedar

The following Table 1 Culvert Replacement project sites from Table 1 have no POC present: John's Creek Main Stem, John's Creek Tributary, Upper Moon Creek #1, Upper Moon Creek #2, and Steele Creek.

The following roads leading to the project sites have no POC present: John's Creek Roads 29-12-1.1 and 29-12-7.1, Upper Moon Creek #1/2 Road 26-11-33.0, and the Steele Creek county road. Also, no POC is present at proposed waste disposal sites.

POC was found at the North Fork Elk Creek project site on private lands. This site has a few green POC within 50 feet of each side of the culvert replacement and one dead POC (about 24" DBH), all of which are located on private lands. Road 28-11-26.3 has a few POC located along the roadside, which is on the haul road to the disposal site. Road 28-11-26.3 is infected with PL.

The Project Design Features described under Section II above are expected to mitigate any effects on maintaining POC as a species and reducing the spread of PL.

Soils

The North Fork Elk Creek location is comprised of a Kirkendall silt loam, slopes are generally 0 to 3 percent. This is a flood plain soil type that is well drained but has moderately slow (0.2 -0.6 inches per hour) permeability. Runoff is slow and the hazard of erosion is slight. This soil type has several limitations, but most refer to grazing or agricultural activities and will not affect this proposed project. This site is actively failing as the pipe bottom has been compromised for many years and the sub-grade fill is now being removed through erosional processes. The pavement support at this site is failing due to this sub-grade failure.

The soils within the vicinity of the remaining culverts listed in Table 1 include Preacher-Bohannon Loams, Preacher-Blachly Association, Milbury-Bohannon-Umpcoos Association, Digger-Preacher-Umpcoos Association, and the Blachly silty clay loam. However, it is not known if the fill materials used for the original culvert placements originated from local soils or if it had been imported from elsewhere.

Section IV - Environmental Consequences

This Environmental Consequences section is the scientific and analytic basis for the comparison of the No Action and the Proposed Action alternatives described in Section II. The potential direct, indirect, and cumulative impacts to the affected resources are discussed in this section under each alternative. It should be noted that the lands where these projects occur have been previously impacted by the initial construction of roads, and no irreversible or irretrievable commitment of resources, other than fossil fuels, have been identified for either of the alternatives.

Critical elements of the Human Environment

The following critical elements of the human environment are not expected to be affected in any measurable way:

- Air Quality
- Areas of Critical Environmental Concern
- Cultural resource values
- Farm lands, prime or unique
- Native American religious concerns
- Hazardous Materials and Solid Wastes
- Wild and scenic rivers
- Wilderness values

Minor short-term impacts could occur to:

- Floodplains
- Threatened and Endangered Species (plants or animals)
- Water Quality
- Wetlands and Riparian Zones
- Noxious Weeds
- Port Orford Cedar

Alternative 1 - No Action

Wildlife - Including T&E Species

Direct and Indirect Affects: Under this alternative, failing culverts would eventually deliver excess sediment to downstream reaches, and the culverts proposed for replacement or removal would possibly remain impassable to most amphibian and invertebrate species. Culvert outlets would remain above the streambed surface and continue to be inaccessible to species which are weak swimmers or move along the stream bottom. Without structures countersunk below stream grade, or designed to trap and retain natural substrate, little sediment is likely to be deposited or remain within the culvert.

Most aquatic-dependant amphibian species would be incapable of traveling through these structures to reach the habitat upstream, which would limit movement and dispersal to species capable of extensive overland travel. Although adult amphibians are capable of overland travel, research strongly suggests that forest roads can be barriers to overland migration for many species (deMaynadier and Hunter 1995). Species such as Southern Torrent Salamanders could remain effectively isolated from adjacent populations. Even species such as Pacific Giant Salamanders and Tailed Frogs, which are capable of overland travel as adults, would be at greater risk of mortality from hostile environmental conditions, predation, or vehicle traffic.

Cumulative Affects: Under the No Action alternative, opportunities to restore the continuity of the stream ecosystem within these drainages would be foregone. The potential for genetic exchange between numerous isolated populations of many aquatic and riparian wildlife species would be extremely limited. Likewise, the potential for these species to successfully recolonize sites from which they are extirpated, even after the habitats recover would be extremely low. If the stream crossings continue to function as barriers to wildlife movement and dispersal, populations of affected species are likely to experience further declines.

No effects to any T&E wildlife species would occur under the No Action alternative.

Aquatic Habitat/Fisheries, Including T & E Species

Direct and Indirect Affects: Under the No Action alternative, fish would not be able to access historic habitats above culverts that are partial or complete barriers. Stream crossings that present barriers to juvenile salmonids and non-salmonids would continue to block their passage to smaller tributaries that are important to their survival for overwintering, and refuge from high temperatures in mainstem tributaries during the summer months. The survival and reproduction of local populations could possibly decline if individuals remain limited to mainstem habitats.

If the two stream crossings on Moon Creek are not removed, there is a high potential for sediment to be delivered to fish-bearing stream reaches downstream when they do fail. Pulses of sediment that could be released would likely degrade spawning and rearing habitat, and possibly result in direct death or injury of fish.

Cumulative Affects: The benefits of improved passage and dispersal of fish species described above would not occur in the short-term, and cumulatively reduce survival of some individuals. If the Moon Creek stream crossings fail, low-level chronic delivery of sedimentation would likely persist for several years after the initial large pulse.

Essential Fish Habitat

Essential Fish Habitat (EFH) is defined to include those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity. The effects described above would also pertain to EFH.

Water Quality, Wetlands, and Riparian Habitats

Direct and Indirect Affects: Undersized culverts and rusted through culverts would continue to pose a risk of road fill failure or diversion potential. Surface erosion of fill material and stream crossing failure would deliver sediment to the stream network. Episodic sediment delivery at these locations would impact downstream aquatic habitats and water quality. Channels that are downcutting at culvert outlets will become more isolated from the active channel and floodplain. The act of channel degradation and bank erosion will also continue to affect water quality.

Cumulative Affects: In the long-term, delaying replacement or modification of these culverts would likely create a greater adverse impact to aquatic and riparian resources than the proposal to replace them. If the old culverts fail or are plugged, there is a high probability that excessive sediment would be mobilized and delivered to downstream reaches. This is because the fill could act as a dam until overtopped with streamflow and a dam break flood could occur. These kinds of sudden water releases are very damaging to stream channels and would scour the bed and banks significantly. Alternatively, water piping through fills because of leakage through rusted out culverts could cause a sudden debris flow to occur, consuming the road at the crossing. If culverts are not replaced, the opportunity may be foregone until after they completely fail.

Cultural Resources/Hazardous Materials/Noxious Weeds

No direct, indirect, or cumulative impacts are expected, even if site failure should result from the No Action Alternative. No cultural resources were located at the time of initial construction. No solid wastes or hazardous materials were discovered on or near the project sites. At present, the only nearby noxious weed identified is scotch broom. Scotch broom is currently beyond control in the watershed analysis areas. If site failure should occur, causing the disturbance favored by scotch broom and resulting in additional plants becoming established, current conditions would not be significantly changed.

Port Orford Cedar

Under the No Action alternative, POC that is susceptible to infection to PL would not be removed from the site identified under Section III, and low risk sites (>50 feet from roads and streams) would continue to maintain healthy populations of POC. There would be no direct effect on the viability of POC as a species within its range under this alternative. Indirectly and cumulatively, POC will continue to be infected and die, and PL will continue to spread.

Soils

Under the No Action Alternative, the sub-grade at the North Fork Elk Creek project site will continue to erode, and support for the Bitumous running surface will continue to be weakened. A direct result of this weakened sub-grade could lead to a large slump on the outlet end of the culvert delivering to the stream network. Approximately 50 to 60 cubic yards of material could be delivered, should this

occur. An indirect action, should the failure occur, would be the closure of the road to traffic past this point. The cumulative effect of this no action would be the removal of habitat downstream and the need to route traffic from the Elk Creek road to the south over Big Creek County road.

The two stream crossings on Moon Creek that are proposed for removal are presently failing, and some fill has already eroded into the respective stream channels. If the culvert and fill is not removed at Upper Moon Creek #2, there is a potential for up to approximately 50 cubic yards of fill material to be delivered to the stream system because the culvert is partially blocked, and some fill erosion has already occurred. The crossing at Upper Moon Creek #2 has already lost most of the fill over the culvert, but there is a potential for an additional approximately 10 cubic yards of fill material to erode into the stream channel if the old culvert and remaining fill is not removed.

The remaining stream crossings listed in Table 2 are not presently delivering sediment due to the condition of the culverts or road fill. The proposed projects are intended primarily to improve passage of aquatic organisms, although the rusted bottom in the John's Creek tributary culvert and the cracking and sagging of the Steele Creek box culvert have impacted their structural integrity.

Environmental Justice

There would be no effects to Native Americans, minority, or low-income populations under the No Action alternative. This includes their relative geographic location and cultural, religious, employment, subsistence, and recreational activities.

Energy Exploration, Production, Distribution, and/or Conservation

The alternative of "No Action" does not affect the exploration, development, supply and/or distribution of existing or potential District energy resources. Therefore, this Alternative does not appear to have any direct, indirect or cumulative adverse energy impacts.

Special Status, Survey & Manage, and T&E Botanical Species

No direct, indirect, or cumulative impacts are expected. Under the No Action alternative, site conditions are not expected to significantly change.

Action Alternatives No. 2, 3, 4 and 5

The environmental consequences of the proposed actions on instream and riparian habitats would be similar, regardless of the alternative selected. Although mandatory design features will be incorporated to minimize sedimentation during and following project implementation for culvert removals and/or replacements, some delivery will likely occur during the actual work, and the first rain events following the work. It will be necessary to impact some riparian vegetation in close proximity

to each of the project sites, primarily within the road prism, but this is unavoidable in order to accomplish the work, and disturbed areas will be re-vegetated in as timely a manner as practicable.

Noise and other disturbances from equipment use are also unavoidable, and the duration of the disturbances will vary at each location dependant upon the type of work being done, and the complexity of the project. However, all projects under the action alternatives will be completed in as timely a manner as feasible under the circumstances unique to each site.

As described under the Project Design Features section above, in cases when excess fill results from a project, the material will be placed in a stable location to prevent sediment delivery to aquatic resources. At locations where culverts are removed but not replaced, the banks will be appropriately sloped and seeded to minimize sediment delivery in the short- and long-term.

Wildlife - Including T & E Species

Direct and Indirect Affects: The proposed replacements, modifications, and/or removals of culverts under all action alternatives are expected to significantly improve opportunities for upstream movement and dispersal of most stream and riparian-associated wildlife species. Installing culverts or open-bottom structures with the outlet in direct contact with, or just below the surface of the streambed, will provide amphibians and aquatic invertebrates direct access without leaving their habitats along the stream margin or bottom. Species which are weak swimmers, or typically avoid moving in higher velocity portions of the stream, would be able to access the stream crossing without leaving the streambed or protection of interstitial spaces between the gravel and cobble.

The species associated with Western Oregon streams are believed to be well-adapted to traversing the complex habitats present in natural streams. Boulder, cobbles, and gravel in natural streams provide roughness that reduces water velocity along the streambed, and creates numerous small pockets of quiet water. Some species, such as Southern Torrent Salamanders, move through the interstitial spaces between the substrate, where they are protected from predators and high stream velocities.

The species inhabiting small segments of the stream immediately below the proposed structures may experience minor short-term impacts caused by excavation and/or installation of the structure. These impacts could include deposition of fine sediments on existing gravel or cobble substrates, physical disturbance of existing habitats, and displacement or killing of individuals immediately adjacent to the project site. The siltation that could occur from sediment release has the potential to reduce the diversity of aquatic insects and aquatic invertebrates by reducing interstices in the substrate. When fine sediment if deposited on gravel, species diversity and densities can drop significantly (Spence et al. 1996). However, contract stipulations require this work to be completed using management practices which minimize sediment delivery to the stream. The direct impacts to wildlife species from excavation and installation of these structures are expected to be minimal.

If the John's Creek mainstem culvert is modified to improve passage, rather than be replaced with a new structure, the existing condition for passage of less mobile aquatic-dependant species will be maintained, or perhaps improved to a small degree. However, it's not known if these species would pass through the structure if it is replaced with one simulating a natural stream bottom.

Construction work at the project sites would not cause disturbance of known bald eagle nest sites, spotted owl site centers, occupied marbled murrelet sites, or unsurveyed suitable murrelet habitat. The U.S. Fish and Wildlife Service Biological Opinion (#1-7-98-F-079) authorized a limited amount of Incidental Take due to short duration, low to moderate level disturbance projects (which includes culvert replacement), provided these projects are conducted within specific seasonal time restrictions defined in the Biological Assessment. As described in Section III above, no timing restrictions apply to the project sites.

Cumulative Affects: Removing culverts and installing or modifying stream crossings which remain in direct contact with the streambed will help to restore the continuity of aquatic habitat within the stream network, and provide relatively unimpeded passage for all aquatic and riparian-associated wildlife species. This should help restore genetic exchange between small wildlife populations which have been isolated by prior human actions, and facilitate natural recolonization of habitats from which species have been extirpated by human-caused barriers or natural events. Minimizing human-caused barriers to genetic exchange and recolonization should ensure that the stream ecosystem and associated wildlife populations remain vigorous and resilient.

Aquatic Habitat/Fisheries, Including T & E Species

Direct and Indirect Affects: Implementing the proposed actions, regardless of the alternative selected, is expected to improve fish passage through the stream crossings considerably over the existing condition. Culverts, open-bottom structures, and low water crossings that are flush with the stream bottom or have structures at their outlets to back water into the crossings would provide connectivity for those fish species which have little to no jumping abilities such as sculpin, dace, and lamprey (brook and Pacific species). Allowing fish the opportunity to access their historic habitats would help to ensure maximum habitat usage for the various life history stages. Salmonid species that are currently threatened or proposed would have increased opportunities for reproduction and survival with improved access to smaller tributary streams.

It's likely that there will be some immediate sedimentation downstream of the projects due to the disturbance at the sites, however, the project design features to control sediment as described above will minimize these effects. An additional influx of sediment may occur following the first rain events, but this sedimentation is not expected to significantly disrupt the feeding or reproduction of fish communities. Some riparian vegetation at the project sites will be removed and/or disturbed during construction, but the impacts will be limited to a small area in close proximity to the stream crossings. These effects are expected to have a negligible impact on stream shade, streambank stability, or water quality.

Some minor headward channel degradation may occur upstream of some of the crossings until the streams reach equilibrium following high water events, however, the channels will eventually establish a more uniform grade and improve conditions for upstream and downstream migration of fish and other aquatic organisms. If necessary, check structures or constructed step-down channels will be incorporated into the stream channel to prevent significant headward erosion. These structures would be installed in order to maintain desirable habitat conditions upstream, such as productive alluvial flats and spawning areas.

Although there would be minor impacts to special status fish species, a Programmatic Biological Opinion was issued from the National Marine Fisheries Service approving projects of the type proposed, due to the long-term benefits to fish and critical habitat.

Cumulative Affects: Survival and reproduction opportunities would be improved over the long-term for fish species, and, combined with other management strategies, populations of sensitive species could increase. Fish species in the respective subwatersheds would have an increased ability to withstand natural events (such as floods and drought) that can lead to population declines because of their ability to migrate into more desirable habitats upstream of the culverts. In addition, chronic delivery of low-level sedimentation from the Moon Creek stream crossings would not occur if the proposed projects are implemented.

Essential Fish Habitat

The benefits and effects of the proposed actions on waters and substrates necessary to fish and fish habitat described above also pertain to EFH.

Aquatic Conservation Strategy

The Aquatic Conservation Strategy (ACS) was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands (ROD 1994). The important phrases in these standards and guidelines are "meet ACS objectives," "does not retard or prevent attainment of ACS objectives,"and "attain ACS objectives."

The appropriate landscape scale for evaluating the consistency of individual and groups of projects with the ACS is the watershed, corresponding with the "fifth-field" hydrologic unit code (HUC) as defined in the "Federal Guide for Ecosystem Analysis at the Watershed Scale" (pages 5-8).

The following analysis describes how the proposed actions maintain the existing condition or lead to improved conditions in the long term for each of the nine ACS objectives.

Objective 1: Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations, and communities are uniquely adapted.

The replacement, modification, or removal of culverts will maintain, and may restore or improve functions such as wood, nutrient, and sediment routing at the site and watershed scale. The removal and/or increased capacity of culverts will aid in the protection of aquatic systems by improving hydrologic functions at the subwatershed scale.

Objective 2: Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically

and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

The replacement, modification, or removal of culverts to improve passage for fish and other aquatic-dependent species will improve the connectivity of stream channels through the correction of barriers created when road construction occurred. The improved connectivity will benefit all aquatic-dependant species that were previously blocked by the culverts.

Objective 3: Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

Increasing the capacity of culverts reduces the potential for chronic and catastrophic erosion, and road failures which can degrade downstream habitats and channels as a result of sedimentation and/or channel scouring events (debris torrents, slides, etc.). Streambanks in the vicinity of the projects will be exposed to a minor impact in the short-term, but design features for construction activities will improve streambank conditions in the long-term.

Objective 4: Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

Increasing the capacity of culverts and removing failing culverts can reduce existing sediment sources and reduce the potential for chronic and catastrophic erosion, and road failure which can result in excessive sediment delivery to channels. Due to the spatial distribution of the culvert locations, short-term sediment pulses affecting water quality from these activities have negligible impacts when assessed at the 5th-field watershed scale.

Objective 5: Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

Increasing the capacity of culverts can provide the necessary routing of sediment through the stream network and to the downstream reaches in a manner that is in balance with storm events and normal channel flows. The proposed projects will not produce excessive sediment or turbidity due to the PDC and other erosion control measures (ie. seed, and mulching all disturbed areas) proposed. Generally a short duration pulse of fine sediment is produced during initial installation and removal of the sediment control structures in the stream environment. Plumes of turbidity are not expected to be in short duration and the impacts to be negligible when viewed at the 5th field scale.

Objective 6: Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

The proposed actions are not likely to have an effect on instream flows, but patterns of sediment, nutrient, and wood routing will be enhanced for the reasons described above.

Objective 7: Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

The proposed actions will restore natural stream velocities at and within culverts, allowing for channel aggradation and subsequent increased connectivity to adjacent floodplains. There will be little, if any, effect on water table elevation in meadows and wetlands.

Objective 8: Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

The replacement of culverts will disturb riparian vegetation in the immediate vicinity of the projects. However, the unavoidable vegetation management activities affect a small portion of the riparian reserves, but species composition and structural diversity of plant communities along stream channels will be maintained. Increasing the capacity of the culverts and removing failing culverts will reduce streambank erosion in the long-term.

Objective 9: Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

Improving passage will restore access to habitat previously inaccessible due to improperly placed culverts and help maintain well-distributed populations of aquatic- and riparian-dependent species.

Water Quality, Wetlands and Riparian Habitats

Direct and Indirect Affects: The design features of the proposed actions and use of Best Management Practices (BMP's) (Appendix H, RMP, 1994) during culvert work would reduce many potential adverse effects to water quality. The potential for large-scale sediment delivery in the form of road or culvert failures would be replaced with short-term, low-level sedimentation resulting from exposed soil where the culverts are replaced. Most of the sediment would be delivered in the first rain event following construction. Once vegetation is established on these areas, there should be negligible erosion or sedimentation. The risk of failure during large storm events would be reduced by the installation of culverts designed to handle the 100 year flood stage at near normal stream widths with plenty of capacity for floatable material. Removal of some riparian trees and brush would occur in the vicinity of the road grade and large culverts to allow for proper alignment, but this should not significantly impact soil and hillslope stability. Streams would remain constrained by roads. Redistribution of stream substrates would occur above, within and below the structures restoring a more natural gradient to the stream.

Cumulative Affects: Increasing the size (combinations of width and height) of the culverts to withstand a 100-year flood event or removing them entirely would greatly reduce the potential for roadbed failures. In general, most culverts plug at the inlet during rising and peak water levels. When culverts are undersized, the constriction of water flow at the inlet causes sediment to accumulate,

which may partially or completely plug the culvert. Additionally, when these culverts are full of water, large amounts of debris cannot pass through the pipe. If the accumulation of sediment, debris, or a combination of both effectively plugs the culvert, the road surface, road fill, and/or culvert may be washed out. Larger structures reduce the potential risk for plugging, and associated road surface or road fill failure.

Immediate replacement of the North Fork Elk Creek culvert would be beneficial, as would the removal of the Upper Moon Creek culverts, because there would be a dramatic reduction in the risk of crossing failure and associated downstream sedimentation. This is a positive benefit to direct, indirect and cumulative effects.

Cultural Resources

No direct, indirect, or cumulative impacts are expected. Each project area has been previously disturbed during initial road construction or culvert installation. The Proposed Action will not result in additional ground disturbance beyond the original disturbed sites.

Hazardous Materials

No effects are anticipated from the proposed actions unless a release of hazardous materials occurs as a result of operations. Depending upon the substance, amount, and the environmental conditions, in the area affected by a release, the impacts could range from minimal to lasting and significant. However, BMP's with spill kits and containment plans should minimize the risk. Notifications in the event of a release threatening waterways are to be made in accordance with the BLM Coos Bay District Riparian Spill Plan, and Oregon DEQ Administrative Rule (OAR) 340-108, *Oil and Hazardous Materials Spills and Releases.*

Special Status, Survey & Manage, and T&E Botanical Species

No direct, indirect, or cumulative impacts are expected. Each project site has been previously disturbed during initial road construction or culvert installation.

Noxious Weeds

Direct and Indirect Affects: Direct impacts could occur because washing of vehicles and heavy machinery only reduces the amount of seeds carried by equipment. Thus, noxious weeds could be introduced to the project sites if present on the vehicles or heavy machinery and they fall off and germinate. Impacts could occur from existing seed beds germinating after treatment of existing noxious weeds, plus the ground disturbing activities, and before the site is recaptured by grass seed or native plants. Also, during this time the site will be susceptible to invasion by seeds from nearby noxious weed plants..

Cumulative Affects: Any new introductions of noxious weeds identified would receive the highest treatment priority to eradicate them and prevent them from becoming established or spreading. . Initial treatment of existing noxious weeds, washing of vehicles/machinery, and seeding of disturbed soils should help prevent further spread of existing noxious weeds and help prevent the introduction of new weeds. No additional cumulative impacts are anticipated resulting from the proposed verses the no action alternative.

Port Orford Cedar

Under the Proposed Actions, POC most susceptible to infection will be removed from along roads and stream crossings at high risk sites identified under Section III. Low risk sites (>50 feet from roads and streams) would continue to maintain healthy populations of POC. The Project Design Criteria for POC listed under Section II is expected to result in no direct, indirect, or cumulative effect on the viability ofPOC as a species within its range.

Soils

The proposed action at the North Fork Elk Creek site will repair the current slumping condition to the sub-grade and the road surface, and the proposed projects on Moon Creek will repair the failing road fill at the stream crossings. The delivery of the sub-grade material to the stream network will cease at these sites, and there will be negligible increases to turbidity and fine sediment delivery during the construction of the replacement structure in the case of all projects involving culvert replacements. Best Management Practices (BMPs) have been developed and outlined in the project design criteria that will limit delivery of soil and maintain water quality. The indirect effect to this proposed project will be the long-term safety to traffic using the roads where culverts would be replaced, and the increased quality to the downstream habitat. The increased capacity of the structures and the ability to move sediment through will reduce the risk of debris jams at the mouth, and restore the routing and delivery of sediment and organic debris.

Environmental Justice

The proposed area(s) of activity are not known to be used by, or disproportionately used by, Native Americans, and minority or low-income populations for specific cultural activities, or at greater rates than the general population. This includes their relative geographic location and cultural, religious, employment, subsistence, or recreational activities that may bring them to the proposed area(s). Also, BLM concludes that no disproportionately high or adverse human health or environmental effects will occur to Native Americans, and minority or low-income populations as a result of the proposed action(s).

Energy Exploration, Production, Transportation, and/or Conservation

The action alternatives for culvert replacements or modifications do not constitute a permanent removal of access or obliteration of the road system. On the contrary, replacement of crossings maintains access. Those crossings that are being removed complete a decommissioning. The road system could be accessed in the future if exploration and production warrant such action. Therefore, this alternative does not appear to have any direct, indirect or cumulative adverse energy impacts.

Effectiveness of Proposed Action Design Features

By use of Best Management Practices [BMP] (Appendix D of the RMP includes timing and scheduling of activity, methodology, equipment, project design, and erosion control measures) the Proposed Action is expected to meet or exceed Water Quality Standards for the State of Oregon and the Coos Bay District's RMP in the long-term. In addition, the incorporation of the specific design features and environmental protection measures and mitigations discussed here in and in Section II will minimize impacts to resources, meet current legal requirements, and improve passage of amphibians, fish, and woody debris.

Monitoring of Proposed Action

1. Stream crossing structures would be monitored by area biologists, hydrologists, and engineers to determine if design objectives are initially achieved, or if modifications are necessary. Monitoring would consist of:

    - Visual inspections of each culvert and stream crossing.

    - Surveys of the streams above the crossings to document successful fish passage.

    - A series of photos including the inlet, outlet and representative location within each structure.

2. Culverts would be inspected and maintained on a routine basis, following the guidelines recommended in the District Transportation Plan to meet ACS objectives.

3. Monitoring would report any new noxious weed infestations, and report on the resulting impacts to any existing noxious weeds from initial treatments or as result of the project and its design features.

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